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VOICE OF THE ELECTRIC UTILITY INDUSTRY

LATE NEWS

The Public Service Co. of New Hampshire board endorsed Northeast Utilities Co.'s $2.3 billion acquisition plan as part of a bankruptcy reorganization. Creditors' and stockholders' representatives previously agreed to NU's boosted bid. The move departs from PSNH's long-held hope to emerge as an independent company. Approvals are still needed from creditors, stockholders, state lawmakers and bankruptcy court. Seabrook full-power licensing is unlikely before Jan. 18.

Spending may hit $26B in '90

BARRINGTON, IL—U.S. electric utilities have planned construction investments totalling almost $26 billion for 1990, an increase of just over 3 percent from 1990 plans announced a year ago.

T&D spending will increase during 1990, but generation spending will fall below the $10-billion level for the first time in decades.

Longer term, *Electric Light & Power's* 1990 survey of capital spending plans of U.S. electric utility organizations—investor-owned, co-op, municipal, federal and other publicly owned utilities—showed a slight decrease in total capital spending for the five years 1990-1994 from five-year plans reported a year ago.

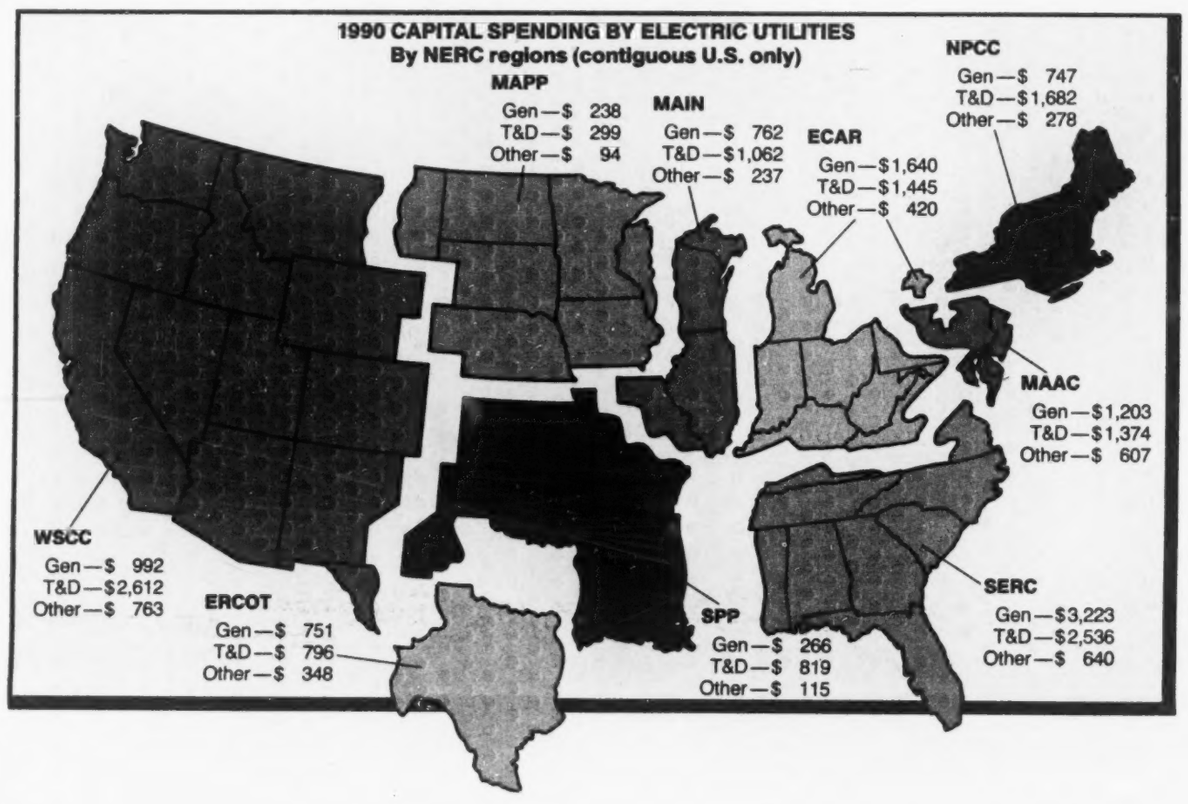
EL&P's Capital Spending Survey is part of a special report: Threshold to the 21st Century, beginning on page 17. The annual survey, which is based on the responses of cooperating utilities, is projected to represent the entire electric utility industry.

The five-year decrease is largely attributable to conservative projections for the fifth year of the period, plus continued low spending for generation. Total spending in that fifth year, $21 billion, is projected to be some $4 billion lower than in the fifth year of the projections made a year ago.

Although spending for generation facilities is slated to fall about $4 billion below 5-year projections made a year ago ($54 billion), T&D spending is estimated to increase almost that much through 1994. "Other" capital spending is projected to fall about 4 percent.

Thirty-four utilities reported that they will need additions to their power supplies before 1995, but only 14 reported plans to add their own capacity in that time period. Twenty-five utilities said they will need new capacity between 1995-2000 and 12 after 2000. But only seven utilities and two utilities, respectively, are planning to build their own generation additions.

Especially troublesome is the fact that of 80 units reportedly in the planning stages, 62 will burn either gas or oil. Only seven are slated to burn coal in baseload steam plants.



DOE delays N-waste repository to 2010

U.S. vs. NIMBYs

SAN FRANCISCO—The federal government will file suit against Nevada, if that state continues to refuse Department of Energy siting tests at Yucca Mountain for storing nuclear waste, the DOE said.

A realistic reassessment of the project's schedule requires extending the completion date until at least 2010, DOE officials added.

"Anyone who is even slightly knowledgeable about the challenges faced on the nuclear repository project must have expected a completion date later than was originally scheduled," explained Deputy Energy Secretary W. Henson Moore at a meeting of the American Nuclear Society and the U.S. Council for Energy Awareness in San Francisco.

The DOE also proposed uncoupling the completion dates for the intermediate Monitored Retrievable Storage (MRS) facility and the permanent site. The date for the high-level nuclear waste respository previously had been extended from the congressionally mandated 1998 to 2003.

Moore stressed that early completion dates were based more on political expectations than on scientific data. "While no one can guarantee that there will not be any future delays in this project, the scheduled dates that we have now are fully supported by sound technical information."

Nevada conflict continues

The Nevada legislature had passed a resolution saying the Yucca Mountain site was unsuitable, prior to DOE geological tests. In addition, Gov. Bob Miller (D) opposes the Nevada site and

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that the project
would be abandoned if tests show the site is unsuitable.

The waste site news was part of a larger restructuring of management within DOE's Office of Civilian Radioactive Waste Management. OCRWM is responsible for selecting a site and building a permanent underground respository.

To help deal with the federal/state conflict, the administration planned to fill a position created in 1987 called civilian waste negotiator. Also in 1987, the Nuclear Waste Policy Act of 1982 was amended to suspend site characterization activities at all repository sites other than at Yucca Mountain.

The Nuclear Regulatory Commission mentioned that a delay past 2003 might be necessary in its September 1989 request for comments for the first five-year reevaluation of its 1984 Waste Confidence Decision.

Edison Electric Institute's David Swanson said he hopes the new schedule is realistic.

Swanson, EEI senior vice president, pointed out that "The full benefits of the MRS facility are only realized if it is constructed early. Therefore, we support DOE's decision to decouple the MRS construction schedule from that

Continued on page 3

PacifiCorp bids again, includes APS' parent, not MeraBank thrift

PORTLAND—PacifiCorp revised its offer to purchase Arizona Public Service Co. to include APS' parent, Pinnacle West Capital Corp., for $1.87 billion, minus the troubled MeraBank savings and loan subsidiary.

Because of debts amassed by PWCC subsidiaries, the revised offer is less than PacifiCorp's $2.08-billion offer for APS alone (*EL&P*, Dec.'89, p.1).

Although PWCC acknowledged both offers, no decision had been made as of mid-December. The company hired analysts to study the offers.

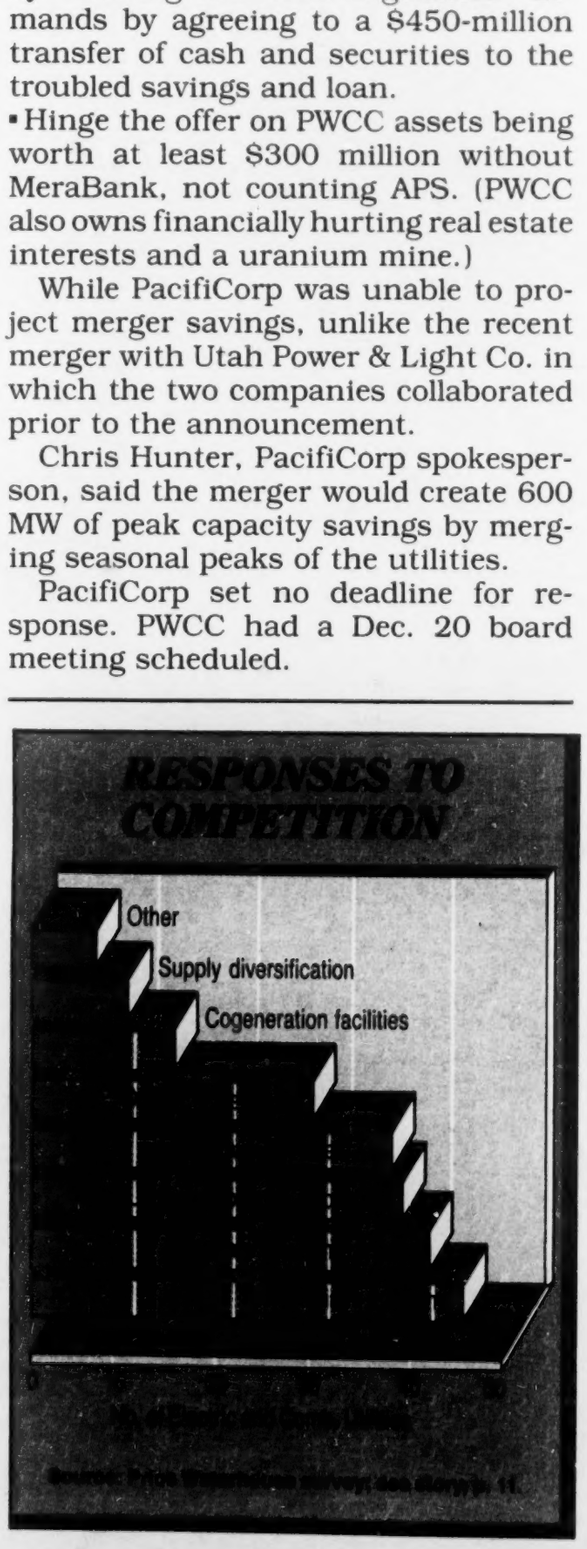
Under the revised offer PacifiCorp would:

- Swap PWCC stock valued at $8 per share for 0.18 share of PacifiCorp share, for a total of about $694 million.
- Assume $800 million in PWCC debt.
- Either pay cash or swap stock for APS preferred stock.
- Require a MeraBank capital infusion and spinoff. PWCC may have satisfied the first part of this requirement Dec. 6 by meeting financial regulators' demands by agreeing to a $450-million transfer of cash and securities to the troubled savings and loan.
- Hinge the offer on PWCC assets being worth at least $300 million without MeraBank, not counting APS. (PWCC also owns financially hurting real estate interests and a uranium mine.)

While PacifiCorp was unable to project merger savings, unlike the recent merger with Utah Power & Light Co. in which the two companies collaborated prior to the announcement.

Chris Hunter, PacifiCorp spokesperson, said the merger would create 600 MW of peak capacity savings by merging seasonal peaks of the utilities.

PacifiCorp set no deadline for response. PWCC had a Dec. 20 board meeting scheduled.



News Briefs

JILL MINNER, Special Projects Editor

PUC requires electric utilities in Ohio to look into least-cost options

The Public Utilities Commission of Ohio has adopted new rules on integrated resource planning which require electric utility companies in Ohio to prove that they have explored least-cost options when making their future load growth plans. According to the NARUC Bulletin, the utilities must provide the commission with new plans that will be subject to hearings and review at least every five years. Under the statute, the PUC must determine whether forecasts of loads and resources are reasonable in relation to population growth estimates and economic development forecasts.

PG&E, environmental groups join to conduct energy efficiency study

Pacific Gas & Electric Co. announced that it will participate in a three-year, $10-million study to improve efficiency in the use of electricity. Also participating in the project are the Natural Resources Defense Council, Lawrence Berkeley Laboratory, and Rocky Mountain Institute (RMI). "We are enthusiastic about this program because it will benefit both our customers and the environment," said Virgil Rose, senior vice president and general manager of PG&E's Distribution Business Unit. According to PG&E, residential, commercial, industrial and agricultural applications of new lighting, building-design and electric-motor technologies will be studied. "This joint project will, for the first time, field test comprehensive packages of the best technologies and measure what they cost and what they save," explained RMI Research Director Amory Lovins.

Iowa-Ill. Investment buys part of Synergics

Iowa-Illinois Investment Co., a wholly owned subsidiary of Iowa-Illinois Gas and Electric Co., has acquired a 44-percent ownership interest in Synergics, Inc. According to Iowa-Illinois Investment, Synergics is an independent power and engineering services company that develops, owns and operates hydroelectric plants and cogeneration projects providing electricity and steam service. "This investment fits with our strategic goal to increase the emphasis in our non-utility investment program on energy businesses," explained Stanley Bright, president of Iowa-Illinois Investment Co.

Consumers Power to sell Bay City operations

Consumers Power said it has agreed to sell its Bay City, MI, residential and commercial electric operations to Bay City Electric Light and Power Co. for $2.4 million. The utilities have duplicative retail electric facilities in Bay City. The transfer of about 4100 customers will take place in stages, according to Consumers Power.

Finnish firm acquires boiler manufacturer

The Keeler Division of Dorr-Oliver has been acquired by Tampella Ltd, a $1.5-billion industrial company headquartered in Tampere, Finland. Keeler has facilities in Williamsport, PA, and Milford, CT, and is a major participant in circulating-fluidized-bed, municipal-waste, and mid-sized industrial boilers. "This acquisition will be a major milestone in Tampella's growth," stated Jorma Alajarvi, president of Tampella's Power Industry Division. "It not only provides us with a U.S. manufacturing and power boiler marketing capability but it provides a base for enhancing retrofit and after sales service for recovery boilers," he added. The new company, Tampella Keeler, will be operationally integrated with Tampella Power Industry Division activities in Atlanta, GA. Regarding the acquisition, Keeler President Albert Leon said that, "...we will now be in a position to exploit our leading-edge circulating-fluidized-bed and municipal solid waste technologies in the European markets where Tampella has a strong presence."

Approval recommended for Virginia Power, ODEC generating plant

The State Corporation Commission (SCC) Public Utilities Staff recommended approval of a coal-fired generating facility to be developed jointly by Virginia Power and Old Dominion Electric Cooperative. The proposed facility is a two-unit, 786-MW plant to be built near Clover, VA. According to the commission, one of the units would be operational by December 1993, and the second by December 1994. The SCC said the project cost is estimated at $805 million.

New chairman takes over at Atlantic Energy

E. Douglas Huggard has been appointed chairman and chief executive officer of Atlantic Energy and Atlantic City Electric Co. He succeeds John D. Feehan who retired as chairman on Dec. 31, 1989. Huggard has served as president and CEO of Atlantic Electric since 1984, and as president and CEO of Atlantic Energy since its formation in 1987. Jerrold L. Jacobs was named president and director of Atlantic Energy and president and chief operating officer of Atlantic Electric.

Central and South West appoints new president

Central and South West Corp. has chosen E.R. Brooks as president and chief operating officer. Brooks, previously executive vice president of Central and South West and president and chief executive officer of Central and South West Services Inc., replaces Merle L. Borchelt as president. Central and South West Corp. is a Dallas-based public utility holding company.

Commonwealth Edison names Zech to board

Retired Vice Admiral Lando W. Zech Jr. has been named to Commonwealth Edison's Board of Directors. "The wealth of experience that Admiral Zech brings with him from the Nuclear Regulatory Commission and the Navy will be especially helpful to Commonwealth Edison in maintaining and enhancing the high levels of performance it has achieved in its nuclear operations," stated ComEd Chairman James J. O'Connor. Zech served as NRC Chairman from July 1986 to June 1989.

CMP chairman chosen

Central Maine Power Co. has selected John J. Russell as chairman of the board. Russell, who will take over his new position on Jan. 25, succeeds the retiring George H. Ellis. A member of the CMP Board since 1977, Russell has also served as CMP vice chairman since 1988.

Gulf States River Bend achieves safety record

Gulf States Utilities Co. announced that employees at its River Bend power plant now hold the best safety record posted by an operating unit of the company. River Bend employees logged in over 8,991,205 safe work hours in early November, according to Gulf States. "I'm proud of the employees for their continuing commitment to quality through safe and reliable operation of the plant," said Gulf States Chairman and President Linn Draper.

Dow coal gasification process wins award

The fourth International Conference on Technologies for Producing Electricity in the 21st Century presented its 1989 Innovative Technology Award to Dow Chemical Co. for its coal gasification process. "The Dow coal gasification plant in Plaquemine, LA, the world's largest single train coal gasification plant, has been successfully operating for two and a half years," stated conference cochairman Seymour Alpert. "This commercial plant has achieved 103 percent of capacity and for 90 consecutive days attained 69 percent of capacity," he added. The conference is cosponsored by the Electric Power Research Institute, the New Energy and Industrial Technology Development Organization of Japan, and Kernforschungsanlage Julich of West Germany.

CEA awards HBM&S for energy efficiency

The Canadian Electrical Association has presented its Energy Efficiency Award for Industry to the Hudson Bay Mining & Smelting Co. Ltd. Flin Flon Division, located in Manitoba. According to Manitoba Hydro, the award is given to the industry which has distinguished itself by achieving exceptional efficiencies in the management of energy through innovative and practical applications. Entries for the award were also judged on cost effectiveness, environmental benefits, impact on quality control and reduced material waste. The award program is intended to encourage industries to review their operations and make changes which will result in more efficient energy use, according to Manitoba Hydro Eastern Region Division Manager Al Macatavish.

Utilities fined by NRC

The U.S. Nuclear Regulatory Commission recently proposed the following fines:

Carolina Power & Light Co.
A $75,000 civil penalty for alleged violation of NRC requirements at the H.B. Robinson nuclear power plant.

Omaha Public Power District
A $25,000 fine for alleged violations of NRC regulations which require the safeguarding of physical security information at the Fort Calhoun Station.

Portland General Electric
A $280,000 fine for alleged violations of NRC requirements involving the operability of a safety system at the Trojan nuclear plant.

Public Service Company of New Hampshire
A $50,000 fine for procedural errors committed during a test at its Seabrook Station nuclear power plant.

Sacramento Municipal Utility District
A $50,000 fine for alleged violations of NRC requirements involving the emergency preparedness program for the Rancho Seco Nuclear Generating Station.

Tennessee Valley Authority
A $87,500 fine for violations of NRC requirements governing the operation of the Sequoyah nuclear power plant.

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COMMENTARY

2000—Closer than you think

It's begun. The decade of the '90s. The last 10 years before the new century dawns. So it's a good time to pause, to look ahead, and back...to see where we've come from and where the industry is going. It's a time to measure successes and failures and assess the industry's future, and the obstacles that may impede progress toward meeting future challenges.

The electric utility industry today is at a crossroad. It has survived two decades of war with new and potent opponents. These forces, charging ahead under the banners of consumerism, environmentalism, anti-growth, anti-establishment, anti-nuclear technology and other well-intentioned causes, caught the industry as it was beginning to recover from its own Pearl Harbor...the Arab Oil Embargo and subsequent run-ups of fuel costs. The industry's been battered by inflation, unfavorable financial conditions, declining load and demand growth, ambitious planning and construction programs, over-zealous and short-sighted regulation and adverse publicity. But despite all these, and more, the industry and most of its parts have met every challenge, providing electric service to customers with the highest reliability of any electric system in the world and with costs that, although not the lowest, are certainly far from the most expensive among nations of the world. The question now is how well electric utilities will perform for the balance of '90s.

The industry's past success would suggest that it can and will meet its challenges, and 10 years from now it will be as ready for 2000 as it's ready for 1990 today. But complacency—status quo thinking—is an opiate. Realistically, developing conditions suggest *status quo* management won't succeed any longer.

The electric utility industry is far different today from what it was less than just five years ago. Reregulation has taken its toll. New holding companies, conceived to facilitate diversification and reap the harvests of non-regulated incomes, have become more the rule than the exception among investor-owned utilities. But many have found diversification to be less of a gravy-train, and more a crap-shoot, with more losers than winners. A number of once-strong industry giants are financially weak. Aggressive state commissions have taught utility managements bitter lessons about risk...called "You bet your company...and you lost."

In response, and with support of federal agencies, managements of many larger utilities no longer plan to build facilities to ensure power supply sufficiency to meet customer demand. Thus, many utilities are depending increasingly on non-utility sources, and Canadian power surpluses.

Our 1990 Capital Spending Survey, page 21, says little baseload capacity will be built before 2000. Morover, despite widespread brownouts and blackouts incurred in the relatively mild summer of 1989, respondents' reported capacity addition plans fall far short of what the Department of Energy, Edison Electric Institute and many other highly qualified observers say is needed for 2000. The survey reveals only about 50,000 MW of new capacity will be built by utilities by the early years of the next century...far short of the 100,000 to 200,000 MW estimated to be needed. Can non-utility sources be counted on to make up the difference? And what can be done to account for the potential reduced output of ever-aging power plants?

The upside of the survey is increased investment in T&D facilities, which may allow utilities to better share the excess capacity in some areas with less fortunate utilities in capacity-deficient areas.

The upshot of all this is that the industry is entering the new decade treading precariously on a tightrope. Declining financial strengths, reduced generation margins, increasing dependence on non-utility sources for energy and greater customer susceptibility to anti-utility movements will make management of electric utility organizations substantially more complex, and probably a lot more uncomfortable for those involved.

Far from being a prophet of doom, I firmly believe electric utility managements can rise to the challenges of the '90s and beyond. But it's going to take a different breed of manager, with strong entrepreneurial courage and the willingness to attack each new problem in light of its own individual characteristics...and a lot more intestinal fortitude *Status quo* management may have worked through the 70s and much of the 80s. But it certainly won't work during the next 10 years.

Robert A. Lincicome, Editor-in-Chief

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PG&E tallies more numbers from earthquake recovery

SAN FRANCISCO—Disaster control comes first; numbers are handled later.

After reconnecting electric and gas customers, repairing facilities and cleaning up the mess after the Oct. 17, 1989, 7.1-magnitude earthquake, Pacific Gas and Electric Co. officials have some more details.

- More than 150,000 out of 3.2-million gas customers required company assistance for checking connections and relighting pilot lights. Cautious customers shut off the majority of those gas connections, although the city fire department asked PG&E to shut off about 7350 for safety reasons.
- About 13 miles of gas line was replaced. More than 10 miles of cast iron and steel pipeline were replaced with plastic pipe. About 1500 services connecting 5400 individual gas meters were replaced, in some areas at a rate of more than 3000 feet per day.
- As much as 70 percent of the required gas-line trench fill, about 1200 tons of sand a day, was screened, sifted and refilled. Without the emergency central recycling plant, debris would have had to be hauled through traffic-congested San Francisco to a landfill site—1.5 hours per round trip, 60 truckloads daily.
- Three 242-kV dead-tank high-voltage circuit breakers were airlifted to PG&E's San Mateo, CA, substation Oct. 21 via a U.S. Air Force C5A transport plane with the help of The Federal Emergency Management Administration and the Department of Defense.

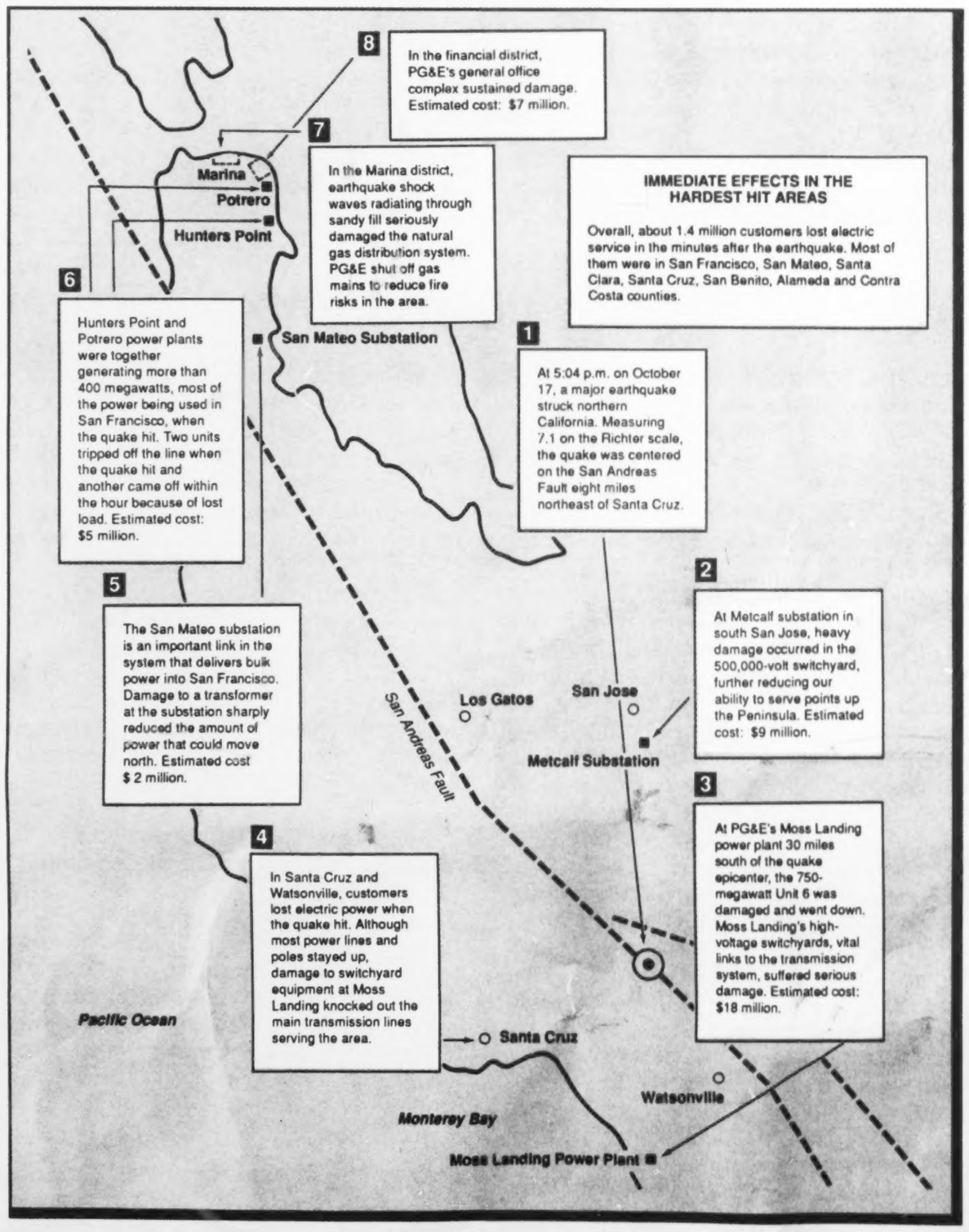
Three additional ones were trucked from the Greensburg, PA, plant Oct. 24 and installed at PG&E's Sobrante substation in Orinda, CA. Westinghouse ABB Power T&D Co. (ABB Power Systems Inc., as of Jan. 1) manufactured the breakers.

- See maps for additional information on electrical outages. (See also *EL&P* '89 Dec. p.1, Nov. p.18.)

Southwire buys Hi-Tech

CARROLLTON, GA—After three months of negotiation, Southwire Co. bought Hi-Tech Cable Corp., whose plant in Starkville, MS, is among the largest copper wire-and-cable production facilities in the United States.

Jim Richards, Southwire's president, said, "This purchase will expand our product line to include industrial power cable and give us a substantial addition to our building wire capacity."


IMMEDIATE EFFECTS IN THE HARDEST HIT AREAS
Overall, about 1.4 million customers lost electric service in the minutes after the earthquake. Most of them were in San Francisco, San Mateo, Santa Clara, Santa Cruz, San Benito, Alameda and Contra Costa counties.
1
At 5:04 p.m. on October 17, a major earthquake struck northern California. Measuring 7.1 on the Richter scale, the quake was centered on the San Andreas Fault eight miles northeast of Santa Cruz.
2
At Metcalf substation in south San Jose, heavy damage occurred in the 500,000-volt switchyard, further reducing our ability to serve points up the Peninsula. Estimated cost: $9 million.
3
At PG&E's Moss Landing power plant 30 miles south of the quake epicenter, the 750-megawatt Unit 6 was damaged and went down. Moss Landing's high-voltage switchyards, vital links to the transmission system, suffered serious damage. Estimated cost: $18 million.
4
In Santa Cruz and Watsonville, customers lost electric power when the quake hit. Although most power lines and poles stayed up, damage to switchyard equipment at Moss Landing knocked out the main transmission lines serving the area.
5
The San Mateo substation is an important link in the system that delivers bulk power into San Francisco. Damage to a transformer at the substation sharply reduced the amount of power that could move north. Estimated cost $ 2 million.
6
Hunters Point and Potrero power plants were together generating more than 400 megawatts, most of the power being used in San Francisco, when the quake hit. Two units tripped off the line when the quake hit and another came off within the hour because of lost load. Estimated cost: $5 million.
7
In the Marina district, earthquake shock waves radiating through sandy fill seriously damaged the natural gas distribution system. PG&E shut off gas mains to reduce fire risks in the area.
8
In the financial district, PG&E's general office complex sustained damage. Estimated cost: $7 million.
Marina
Potrero
Hunters Point
San Mateo Substation
San Andreas Fault
Los Gatos
San Jose
Metcalf Substation
Pacific Ocean
Santa Cruz
Watsonville
Monterey Bay
Moss Landing Power Plant

T&D spending leads construction plans; generation expansion lags through 1994

Gas and oil favored for new generating units, but utilities still are reluctant to commit to building new capacity

Robert A. Lincicome
Editor-in-Chief

The nation's electric utility organizations will continue to accelerate their construction activities through the five-year period ending in 1994. Construction of transmission and distribution facilities will lead the expansion. These are the primary conclusions to be derived from *Electric Light & Power*'s 1990 Capital Spending Survey, which was completed in November.

The survey indicated that spending in 1990 should increase by more than three percent from projections of 1990 spending made a year ago. Total 1990 spending should reach $25.9 billion, and might edge over $26 billion before the year is out. Results from the study, which includes survey data from all types of electric utilities in the nine North American Electric Reliability Council areas, are projected to be representative of the entire industry.

1990 spending plans

Capital spending in 1990 is projected to total $25.9 billion. Although this reflects a drop from projected 1989 spending, it will be $799 million, or 3.2 percent, above 1990 projections made last year. As shown in the table at right, generation spending should be better than $9.8 billion, but this would be down some $200 million from projections made a year ago and would make 1990 the first year in more than two decades that generation spending did not exceed $10 billion.

Transmission and distribution spending, which combines substation, transmission line and distribution service projects, should total $12.6 billion, up almost $1 billion, or 8.3 percent, from the earlier 1990 projections.

Spending in 1990 for other projects should be about $3.5 billion, roughly the same as projected for 1990 in last year's survey.

Spending in 1989 was projected to be $27.5 billion, so the 1990 outlook reflects a decline of more than $1.6 billion. The major difference, as might be expected, is in generation construction, which was projected to total $12.4 billion in 1989 versus $9.8 billion for 1990. Utilities simply have finished the majority of their major generation projects and are moving slowly in terms of beginning new capacity additions. Moreover, as is pointed out below, efforts to modify, upgrade and extend the lives of generating stations still appear to be in low gear.

Five-year outlook good, not great

Longer term construction spending, for the period 1990-1994, should remain at a somewhat higher level than estimated a year ago. However, much depends on spending in the fifth year of the period, 1994. It is normal for estimates of spending in the last year of a five-year period to be lower than in the first four, but this year's survey reflected unusual conservatism.

For the first four years, 1990-1993, spending plans are projected at $106.6 billion. For those same years, the projections made a year ago showed a total of $101.3 billion. Thus this year's survey reflects a healthy, but unspectacular, 5.2-percent increase in capital spending.

But this year's survey projection for the fifth year in the period, $21.1 billion, is $4 billion below the fifth year's projections in last year's study. Both generation and distribution projections for the fifth year are about $2 billion below fifth-year projections made a year ago.

Generation spending demonstrates no definite trend. Instead, generation capital expenditures bounce up and down through the period, but will average $9.99 billion for each of the five years. This represents an $809-million, 7.5-percent decline from projections made a year ago.

Transmission and distribution spending, which includes amounts specified for substations, will total $61.9 billion, $4.4 billion or 7.7 percent more than projected a year ago. Average annual T&D spending over the period will be $12.4 billion.

Readers are cautioned that all three sets of figures making up T&D expenditures are subject to error since some companies isolate substation spending, others combine substation expenditures into their spending plans for transmission and distribution expansion, and still others give only a single expenditure figure for all T&D expansion.

Spending in the "other" category is scheduled to decline throughout the five-year period.

Readers also are cautioned that totals shown in the accompanying tables reflect rounding and slight variations may appear between them and added categorized capital expenditures.

NORTH AMERICAN ELECTRIC RELIABILITY COUNCILS

ECAR	East Central Area Reliability Coordination Area
ERCOT	Electric Reliability Council of Texas
MAAC	Mid-Atlantic Area Council
MAIN	Mid-America Interpool Network
MAPP	Mid-Continent Area Power Pool
NPCC	Northeast Power Coordinating Council
SERC	Southeastern Electric Reliability Council
SPP	Southwest Power Pool
WSCC	Western Systems Coordinating Council

1990 CAPITAL SPENDING BY NERC REGION
(Contiguous U.S. only—In millions of $)

Region	Generation	Substations	Transmission	Distribution	Other	Total
ECAR	$ 1,640	$ 211	$ 272	$ 962	$ 420	$ 3,505
ERCOT	751	32	235	529	348	1,895
MAAC	1,204	150	214	1,011	607	3,186
MAIN	762	64	320	678	237	2,061
MAPP	238	54	98	147	94	631
NPCC	747	377	315	990	278	2,707
SERC	3,223	164	574	1,798	640	6,399
SPP	266	70	221	528	115	1,200
WSCC	992	281	726	1,605	763	4,366
Total	**$9,822**	**$1,403**	**$2,976**	**$8,246**	**$3,502**	**$25,950**

CHANGING PATTERNS OF INVESTMENT
1990-1994

Function	1990	1991	1992	1993	1994
Generation	37.85%	38.06%	35.75%	39.94%	45.18%
T&D	48.65%	49.57%	51.41%	48.36%	43.61%
Other	13.50%	12.36%	12.84%	11.71%	11.21%
Total	**100.00%**	**100.00%**	**100.00%**	**100.00%**	**100.00%**

Funds for generation will remain at below 40 percent of total capital expenditures through 1993, then will surge to 45 percent in 1994.

Transmission and distribition expenditures will increase from more than 48 percent in 1990 to almost 51.5 percent in 1992, then their share will decline through 1994. Total 1994 expenditures appear to be exceptionally conservative and unrealistically low, as mentioned above. Generation expenditures in that year are envisioned to be more than a half-a-billion dollars below the average for the previous four years. Also, fifth-year T&D estimates reflect the usually shorter lead times for T&D programs and are probably artificially low. The combination of these two facts also is a large factor in the relative shift in the percentages for generation and T&D in that year.

Seventy-one utilities reported their capacity needs until after 2000. Of these, more than half (34 utilities) indicated need for new capacity before the end of 1994. About 35 percent said they will need new capacity between 1995 and 2000 and 12 reported that they will need new capacity after 2000.

But only about 20 percent currently have plans to add their own capacity through 1994, 10 percent between 1995 and 2000, and just 7 percent after 2000.

Clearly, developing programs to utilize the capacity of cogenerators, independent power producers and demand-side alternatives loom large in utility plans to meet increasing load.

Respondents reporting plans for new capacity favor small units of less than 200 MW. Almost half the 72 units specified will be under 100 MW and 28 percent will be between 100 and 200 MW. Only 10 percent will be sized above 500 MW.

Utilities reported that almost 70 percent of the units planned will either be combustion turbines or combined cycle units. Less than 10 percent will be base-load steam units.

As to fuel, natural gas is the choice for 60 percent of the units. Oil was picked for 18 percent of the units planned. Coal is the specified fuel for seven units, the same number of baseload

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PROJECTED 5-YEAR CAPITAL EXPENDITURES
(By NERC Region — In millions of $)

Region	1990	1991	1992	1993	1994	5-Year total
ECAR	$ 3,505	$ 3,972	$ 3,575	$ 3,586	$ 3,223	$ 17,860
ERCOT	1,895	1,933	751	1,024	1,553	7,155
MAAC	3,186	3,207	3,308	3,443	3,872	17,016
MAIN	2,061	2,042	1,973	1,763	931	8,770
MAPP	631	574	519	447	460	2,630
NPCC	2,707	3,030	3,027	3,021	1,304	13,089
SERC	6,399	7,183	6,176	7,635	5,877	33,270
SPP	1,200	1,464	1,406	1,460	1,224	6,755
WSCC	4,366	4,480	4,863	4,778	2,607	21,094
Total	**$25,950**	**$27,883**	**$25,597**	**$27,159**	**$21,050**	**$127,639**

PROJECTED 5-YEAR CAPITAL EXPENDITURES
(By Function — In millions of $)

Function	1990	1991	1992	1993	1994	5-Year total
Generation	$ 9,822	$ 10,614	$ 9,150	$ 10,846	$ 9,512	$ 49,944
Substations	1,403	1,512	1,458	1,501	1,165	7,038
Transmission	2,976	3,472	3,559	3,135	2,286	15,429
Distribution	8,246	8,838	8,143	8,497	5,728	39,452
Other	3,502	3,447	3,287	3,180	2,360	15,776
Total	**$25,950**	**$27,883**	**$25,597**	**$27,159**	**$21,050**	**$127,639**